APPLICATION FOR UNITED STATES PATENT

by

Tsangto Chai

assignor to:

Winplus Company, Ltd.

for

EASILY CONSTRUCTABLE AND COLLAPSIBLE PORTABLE TENTS

Prepared by:
Robert D. Buyan
STOUT, UXA, BUYAN & MULLINS, LLP
4 Venture, Suite 300
Irvine, CA 92618
949/450-1750 x220
fax: 949/450-1764

DOCKET NO. WNPLS-002A

Express Mail No. EL921452646US

EASILY CONSTRUCTABLE AND COLLAPSIBLE PORTABLE TENTS

FIELD OF THE INVENTION

This invention relates generally to collapsible structures and more particularly to portable tents that are constructed to be easily constructed and collapsed.

BACKGROUND OF THE INVENTION

A variety of portable tents and similar collapsible structures have heretofore been known, includint those described in United States Patent Nos. 6,209,557 Zheng), 5,038,812 (Norman), 5,467,794 (Zheng) and 5,560,385 (Zheng). These portable tents and similar collapsible structures may be used by children or adults for temporary shelter, camping, as beach cabanas, play houses, etc.

The ease with which portable tents or other collapsible structures may be constructed and collapsed is a significant factor that determines their desirability for use in applications that require rapid or frequent construction and collapsing or easy portability, such as when these collapsible structures are used as beach cabanas, temporary play houses or while hiking, backpacking, rock climbing, etc.

Also, two or more portable tents or other collapsible structures are sometimes used in conjunction with one another and, in at least some applications, it may be desirable to connect two or more portable tents or other collapsible structures to one another to facilitate easy passage of humans, animals or objects from the interior of one structure to the interior of another structure.

Although the portable tents and similar collapsible structures have included a number of different designs, no one prior design is believed to be optimal and their remains a need in the art for the development of new and different portable tents and similar collapsible structures that are useable in new ways or are more easily collapsed/constructed or more easily portable than those of the prior art.

SUMMARY OF THE INVENTION

The present invention provides a collapsible structure (e.g., a tent, cabana, play hose, etc.) that generally comprises a plurality of pole members, a flexible covering disposed on the pole members, a plurality of strut members that are connected to the pole members and a hub assembly having upper and lower hub members, the hub assembly being attached to the pole members and the strut members. The structure is alternately disposable in a) a constructed configuration wherein the lower hub member is in abutment with the upper hub member and the flexible covering is drawn taut between the pole members and b) a collapsed configuration wherein the lower hub member is a spaced distance below the upper hub member, the pole members are closer together than they are when the structure is in its constructed configuration and the flexible covering is loosely disposed between the pole members.

Further in accordance with the invention, the strut members may be configured to exert an upward bias on the hub assembly when the structure is in its constructed configuration, thereby holding the hub members in substantially fixed vertical positions relative to one another and preventing the structure form inadvertently collapsing during use. When downward pressure is applied to the hub assembly, the upward bias of the strut memebrs is overcome, thereby releasing the hub assembly, allowing the upper and lower hub members to separate from one another and allowing the structure to assume its collapsed configuration.

Still further in accordance with the invention, the hub assembly may incorporate or be provided with locking structure(s) which mechanically lock the upper and lower hub members together when the structure is in its constructed configuration. These locating structures may be unlocked when it is desired to convert the structure to its collapsed

configurations, thereby allowing the upper and lower hub members to move apart from one another and allowing the structure to assume the desired collapsed configuration.

Still further in accordance with the present invention, there are provided systems for attaching a plurality of collapsible structures of the forgoing type (or of any other type) to one another to form a multiple-structure assembly comprising a plurality of collapsible structures that are interconnects or linked to one another. Openings are formed in the individual collapsible structures and tunnel members are attachable to those openings so as to link the individual structures together and to provide enclosed or partially enclosed passageways between the individual collapsible structures that make up the multiple-structure assembly.

Still further in accordance with the present invention, collapsible structures of the forgoing type (or of any other type) may be provided with decorative markings or decorative items to impart entertaining or desired appearance(s) to the structure. For example, collapsible structures my have the appearance of a character (e.g., an animal or cartoon character). The decorative markings may be situated such that a door or flap which provides for passage into and out of the collapsible structure is positioned within an opening of the decorative object (e.g., the mouth of an animal or fish, the opening of a cave or volcano, etc.), thereby giving rise to the appearance that children or other users of the structure are passing into the opening of the decorative object as the enter the collapsible structure. In multi-unit embodiments, the decorative markings formed on each individual unit of the multi-unit assembly may fit together to give rise to a single decorative object (e.g. an elongate animal such as a snake or eel).

Further aspects and elements of the present invention will be appreciable to those of skill in the art upon reading the detailed descriptions of embodiments set forth herebelow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of a collapsible structure of the present invention in its fully constructed state.

FIGURE 2 is a perspective view of the collapsible structure of FIGURE 1 in its collapsed state, immediately after removal from its optional carrying case.

FIGURE 3 is a perspective view of the collapsible structure of FIGURE 2 in a partially constructed yet still partially collapsed state.

FIGURE 4 is an enlarged view of portion 4-4 of FIGURE 3.

FIGURE 5 is an enlarged view of portion 5-5 of FIGURE 3.

FIGURE 6 is a perspective view of the top portion of the collapsible structure of Figures 1-5 in a nearly fully constructed state.

FIGURE 7 is a perspective view of the top portion of the collapsible structure of Figures 1-5 in its fully constructed state.

FIGURE 8 is sectional view taken vertically through the upper and lower hub members of the upper assembly of the collapsible structure shown in Figure 1.

FIGURE 9 is another sectional view taken vertically through the upper and lower hub members of the upper assembly of the collapsible structure shown in Figure 1.

FIGURE 10 is a sectional view taken vertically through the upper and lower hub members of the upper assembly of the collapsible structure shown in Figure 1 while in its locked in its constructed configuration.

FIGURE 11 is a sectional view taken vertically through the upper and lower hub members of the upper assembly of the collapsible structure shown in Figure 1 after

downward pressure has been applied to the upper hub member so as to cause the lower hub member to separate from the upper hub member and causing the structure to begin to transition from its constructed configuration to its collapsed configuration.

FIGURE 12 is a collection of perspective views of multiple unit embodiments oc the persent invention with and without decorative markings formed thereon.

FIGURE 13 is a diagram of an alternative hub assembly that is useable in embodiments where structure is locked in its constructed configuration with the internal angle between a longitudinal axis projected through each the strut member and an axis projected through the center of the hub member (e.g., a vertical axis) is less than or equal to 90 degrees when the structure is in its fully constructed state.

FIGURE 14 is a diagram of another alternative hub assembly that is useable in embodiments where structure is locked in its constructed configuration with the internal angle between a longitudinal axis projected through each the strut member and an axis projected through the center of the hub member (e.g., a vertical axis) is greater than 90 degrees when the structure is in its fully constructed state.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

The following detailed description is provided for the purpose of describing only selected embodiments or examples of the invention and is not intended to describe all possible embodiments and examples of the invention.

Figures 1 and 12 show an examples of a collapsible structures 10 of the present invention in their fully constructed configurations. As shown in Figure 1, each collapsible structure 10 generally comprises a) a support frame formed of a plurality of pole members 14, a plurality of strut members 60 and upper and lower hub members 38,32 and b) a flexible covering 22 formed of woven nylon, plastic sheet or similar material. As shown in

Figure 12, flexible covering 22 has a flap opening 21, such flap 21 being securable in a closed position by a zipper 23.

Optionally, as shown in Figure 1, a removable panel 24 may be formed in the flexible cover 20 to and such removable panel 24 may be secured to the flexible cover by a zipper 25. When the removable panel 24 is removed and opening is formed in the flexible cover 22 of the collapsible structure 10. As shown in Figure 12, and optional tunnel members 60 may be used in conjunction with two of the collapsible structures 10 that have optional removable panels 24 to form a multi-unit collapsible structure. The optional total member 60 preferably comprises a to the formed of flexible material such as woven by a line, plastic sheet or other suitable material. Zippers may be formed around the either end of the tunnel member 60 and may be mated or meshed with the portions of the zippers 25 that remainin on the flexible covers 22 of the collapsible structures 10 after their optional removable panels 44 have been removed. In this manner, one end of a tunnel member 60 may be connected to an opening formed in one collapsible structure 10 and the other end of that tunnel member may be connected to an opening formed in another collapsible structure 10, thereby forming a multi-unit collapsible structure wherein the tunnel member 60 acts as a passageway between two collapsible structures 10. Although the embodiments shown in figure 12 utilize only two collapsible structures 10, it will be appreciated that more than one removable panel 24 may be formed in some collapsible structures 10 and three or more of the collapsible structures 10 may be joined by tunnel members 60 to form multi-unit collapsible structures of this invention that incorporate more than two of the individual collapsible structures 10 of the type shown in Figure 1.

Also, and shown in Figure 12, decorative markings 62 may be formed on the flexible covers 22 and/or on the optional tunnel members 60 to impart a desired appearance. These optional decorative markings 62 may be used on single-unit or multi-unit collapsible

structures 10 of this invention and may be particularly desirable when the collapsible structures 10 are intended for use as children's beach cabanas, children's playhouses, doll houses or otherwise for the entertainment of children. In these types of applications, it may be desirable for the decorative markings 62 to impart the appearance of an insect or animal. In this regard, the decorative markings 62 may be in the nature of facial features such as eyes, nose and mouth and the opened mouth of the creature may appear around the entry flap 21 of a collapsible structure 10 to give the appearance of entering through the mouth of the creature as a child passes through the entry flap 21.

The collapsible structures 10 of the present invention may be easily constructed and easily collapsed and folded to a stowable configuration. When in their fully collapsed states, the collapsible structures may be inserted in two caring cases or bags. A desired carrying case (not shown) comprises a light weight, woven nylon case that has carrying handles and a zipper for opening and closing the carrying case.

To fully appreciate the manner in which the collapsible structure 10 may be constructed and collapsed, it is helpful to consider and understand the components, design and function of the support structure and the manner in which the flexible cover 22 is disposed upon the support structure. The support structure generally comprises a plurality of pole members 14, a plurality of strut members 16, a hub assembly 29 comprising an upper hub member 38, a lower hub member 32 and an actuator 30. The pole members 14 extend through elongate receiving channels 15 formed in the corners of the flexible cover 22 and the bottom ends of the pole members 14 are inserted into tabs 19 that are attached to and extend from the bottoms of the corners of the flexible cover 22. Each tab preferably comprises a pocket formed of durable fabric and having an opening in its top edge such that the bottom end of a pole member 14 may be received within the pocket as shown in Figure 5. When the structure 10 is collapsed, as shown in Figures 2 and 3, the pole members 14 are substantially straight, the upper and lower hub members 38, 32 are

separated and spaced apart, and the flexible cover 22 is loosely disposed. Also, hinged joints 20, as shown in Figure 4, are formed in the pole members 14 approximately midway along their length. When the hinged joints 20 are extended as shown in Figure 3, they reside within the receiving channels 15 of the cover 22 between notches or cut out areas 66 formed in the fabric that defines the channels 15. These hinged joints 20 may be folded over in the manner shown in Figure 2 to further collapse the structure 10. The presence of the notches or cut away areas 66 facilitates such folding of the pole members 14 at their hinged joints 20 by preventing the fabric of the cover 22 that forms the channels 15 from bunching or binding the hinged joints 20.

The process of converting the collapsible structure 10 from its collapsed configuration shown in Figure 2 to its constructed configuration shown in Figure 1 begins with unfolding of the hinged joints 20 to convert the fully collapsed structure shown in Figure 2 to a partially collapsed states as shown in Figure 3. Thereafter, with the bottom ends of the pole members 14 inserted into their receiving tabs 19, the user may grasp the free ends of the two cords 34, pulling them in opposite, horizontal, outward directions as illustrated in Figure 6. The cords 34 are knotted within the lower hub member 32 as shown in Figure 8. Thus, as the cords 34 are pulled outwardly, the lower hub member 32 will be drawn upwardly toward the upper hub member 38 such that the upper projecting portion 40 of the lower hub member 32 will be received within a bore or concavity 39 formed in the upper hub member 38, and the upper and lower hub members 38, 32 will be in abutting contact with one another. Also, as shown in Figure 10, when the lower hub member 32 reaches its uppermost position in full abutment with the upper hub member 38, the inner ends IE of strut members 16 may be slightly elevated above the outer ends OE of the strut members 16 and such upward slanting of the strut members will serve to exert a biasing force in the upward direction against the lower hub member holding it in abutting contact with the upper hub member 30 even after the user releases the cords 34. Also, as the hub

members 38, 32 are pulled into abutting contact with each other, the pole members 14 will bow to an arcuate configuration, giving the fully constructed structure 10 the configuration shown in Figure 1.

When it is desired to return the structure to its collapsed state, the user may simply push downwardly on the actuator knob 30 to flex the upper assembly 12 and poles 14 downwardly to a position where the inner ends IE of the strut members 16 are now lower than the outer ends OE of those strut members 16. This results in a loss of the upward bias on the lower hub member 32 and allows the lower hub member 32 to separate from the upper hub member 30, as shown in Figure 11. The structure may then be picked up vertically by the actuator knob 30 without constraining or preventing free retraction of the cords 34 and the structure will assume the partially collapsed configuration shown in Figure 3. Thereafter, the hinged joints 20 may be folded over to place the structure 10 in its fully collapsed state as shown in Figure 2. The fully collapsed structure may then be placed in an optional carrying case (not shown) or otherwise carried or transported with ease.

As shown in Figures 10 and 11, when the hub assembly 29 is vertically situated, a hub axis, which in the drawings is shown as a vertical axis VA, is projectable through the center of upper and lower hub members 38, 32. Also, a strut axis SA is projectable through each of the strut members 16. An internal angle A is definable between the strut axis SA and the vertical axis VA. When the structure 10 is locked in the constructed configuration shown in Figure 10, angle A is more than 90 degrees and the outer ends OE of the strut members 16 are lower than or below the inner ends IE of the strut members 16. When the structure 10 is in the unlocked configuration shown in Figure 11(e.g., as it is being collapsed or constructed), angle A is less than 90 degrees and the outer ends OE of the strut members 16 are above or higher than the inner ends IE of the strut members.

In alternative embodiments, such as those shown in Figures 13 and 14, alternative hub assemblies 29a, 29b may be utilized to mechanically or frictionally lock the structure 10 in its constructed configuration without requiring angle A to be more than 90 degrees and without requiring the outer ends OE of the strut members 16 to be above or higher than their inner ends IE.

Figure 13 shows one side of an alternative hub assembly 29a that is useable in embodiments where the internal angle A between the strut axis SA and the vertical axis VA is less than or equal to 90° when the structure is in its fully opened or fully constructed configuration. In this alternative hub assembly 29a, one or more downwardly extending legs G are formed on actuator cap 30a and the actuator cap 30a is at least partially rotatable, as indicated by the labeled arrows shown on Figure 13. Receiving slots A are formed in legs G and protruding keys B are slidably received within slots A to stabilize and guide the up and down motion of actuator knob 30a. The corner surface C of each leg G contacts a protruding key D formed on the lower hub member 32a. A side slot E is also formed on a lower portion of leg G to receive another key member F that protrudes from the lower hub member 32a. When it is desired to convert the structure from its open or constructed configuration to its collapsed configuration, the actuator cap 30 is turned in the counter-clockwise direction to the position shown in Figure 13, wherein key B resides within slot A adjacent to but not within locking side slot AS, and key F resides adjacent to but not within slot E. The actuator cap 30a is pressed downwardly, causing corner surface C to exert downward force on lower hub 32a, causing lower hub member 32a to separate from upper hub member 38a, and allowing the structure to assume its collapsed configuration. When it is desired to convert the structure from its collapsed configuration to its open or constructed configuration, the various elements of the structure will be manipulated into the general configuration sheon in Figure 1 with the hub assembly 29a once again in the configuration shown in Figure 13. Thereafter, the actuator cap 30a is turned in the

clockwise direction. This causes key B to slide into locking side slot AS, and key F to slide into slot E, thereby locking the upper and lower hub members 38a, 32a in fixed vertical positions relative to one another and preventing the structure from inadvertently collapsing during use.

Figure 14 shows one side of another alternative hub assembly 29b that is useable in embodiments where, when the structure is in its fully opened or fully constructed state, the internal angle A between the strut axis SA and the vertical axis VA is greater than 90°. In this alternative hub assembly 29b, one or more downwardly extending legs G ' are formed on actuator cap 30b. When the user presses downwardly on the actuator cap 30b, the legs G ' extend downwardly into abutment with flange h of lower hub member 32b. Slots A ' are formed in the legs G ' and protruding keys B ' are slidably received within slots A, thereby guiding the up and down motion of actuator knob 30b.

Although exemplary embodiments of the invention have been shown and described, many changes, modifications and substitutions may be made by those having ordinary skill in the art without necessarily departing from the spirit and scope of this invention. Specifically, elements or attributes described in connection with one embodiment may also be used in connection with another embodiment provided that the inclusion or use of such element or attribute would not render the embodiment in which it is incorporated unuseable or otherwise undesirable for an intended application. Accordingly, all such additions, deletions, modifications and variations to the above-described embodiments are to be included within the scope of the following claims.